

Unless someone like you cares a whole awful lot, nothing is going to get better. It's Not.
- Dr. Seuss, The Lorax

UNIT I

THE BIG CLIMATE CHANGE EXPERIMENT

Lesson 5: Climate Change Narratives



Unit I Guiding Question

Does the world's rising temperature affect me?

A NOTE FROM THE HOT AUTHORS

The Hot: One World, One Climate curriculum and simulation is a collaborative effort among secondary teachers, educational experts and journalists with faculty and staff from the NASA Goddard Institute for Space Studies (GISS) and the Columbia University Earth Institute. This interdisciplinary team – known as The GISS Climate Education Advisory Group – has been able to draw on many perspectives and areas of expertise to advance a real world, problem-based approach for student learning around many climate change topics.

The curriculum is designed to reinforce academic knowledge and skills outlined in national education standards with an eye toward student inquiry and research-like experiences. While exploring the science and stories of climate change, our goal is for students to use scientific research to build science and climate literacy, evaluate climate change solutions and develop 21st Century skills for informed civic engagement.

Our development process has been an iterative. The Climate Change in the Classroom (CCIC) Teacher Workshop at NASA GISS/Columbia University is a continuation of this process as we broaden the Hot collaboration to include the review, critique and recommendations more scientists and educators from 5 U.S. states.

It is important to note that we are in the active stage of review and development of the Hot curriculum and simulation. Hence, the materials being field-tested in the CCIC are not in their final form and require additional educational and scientific review. This is one of the major goals of the CCIC Teacher Workshop.

We hope that the Hot curriculum and simulation will prove to be a meaningful way for you and your students to engage in learning about Earth, and the intersections of science and society in the context of an important global issue – climate change. We also hope Hot is personally relevant students, and motivates a lifetime of interest and critical thinking about our planet and the special role humans have in the Earth system.

Carolyn Harris

Education Coordinator, Columbia University Earth Institute/NASA GISS & Founder, Real World Matters

Pushker Kharecha

Research Scientist, Columbia University Earth Institute/NASA GISS

Ryan Goble

Professional Development Leader Chicago Public Schools and Founder, Mindblue Productions

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UNIT I AT-A-GLANCE

Students engage in lessons where they develop some basic background knowledge about climate change drawing on research from scientists around the world. They will begin to develop key ideas that climate change is happening, we can observe it and it is a global problem. Students also begin to understand some of the lines of climate change evidence. More fundamentally, Unit I explores the relationship between climate and life, and helps students explain the difference between weather and climate.

Summative Assessment

Write a short news story using initial understandings developed in Unit I to describe the roles of humans and carbon in Earth's climate change story. The essay should accurately relate and explain at least one key climate science concept (e.g., difference between weather and climate) as well as 3 or more lines of climate change evidence. It should also express the influence of these roles in terms of time and spatial scale relevant to the climate change story.

National Education Standards Addressed

Learning objectives for each lesson relate to national education standards found in the Common Core State Standards (CCSS) and Next Generation Science Standards (NGSS). Each lesson identifies the specific standards addressed.

Unit I Learning Progression

Following input received from the 2013 Climate Change in the Classroom Teacher workshop, we will prepare a learning progression for the Unit. In its final form it will provide a short introduction and a lesson grid with brief summaries of student activities, learning objectives, standards addressed and performance assessments.

COMMUNICATE

I.5 CLIMATE CHANGE NARRATIVES TIME: 120-150 minutes or 2-3 class periods + writing time /homework



Photo Credit: Need to Find

"An informed public, therefore, is essential for the world to find effective solutions for one of the most harrowing and complex problems facing humanity. Yet, with the challenge so complex, so encompassing, and with so much inherent uncertainty, finding a path to public understanding and responsible solution action is vast in its own right."

- Climate Change: Picturing the Science

overview

Students develop a persuasive, evidence-based climate change news narrative to educate their peers.

objectives

The student will be able to...

- make connections between different lines of evidence to determine the important factors in climate change
- incorporate time and spatial scale into scientific arguments
- write and present a science-based news story as a blog to explain and educate a general audience about global climate change

Prerequisite

Hot Lessons 1.2 and 1.3

key vocabulary

Consequence: An effect or result that follows a certain set of conditions.

Hypothesis: A proposed explanation for something based on some preliminary evidence.

Scientific consensus: The collective judgment of scientists in a particular field.

Theory: An accepted explanation of how something works based on repeated tests.

differentiation guide

This lesson differentiates content, process, product based on student readiness, interests and learning profile. To be completed...

subjects

English Language Arts, Earth and Environmental Science, Social Studies

standards

NGES ESS3.D Global Climate Change

Human activities affect global warming

CCSS ELA Literacy:

Engage in collaborative discussions and claims and findings (SL.1-3, 4)

Present claims and findings; use multi-media and visuals (SL.4-5)

resources / materials

BBC Climate Challenge Video (2:01 minutes) at <http://goo.gl/SsiAl>

Collaborative Mind Mapping Site - www.mindmeister.com.

For samples of climate news reporting at Climate Desk (www.climatedesk.org) that includes print and video stories from *The Atlantic*, *The Center for Investigative Reporting*, *Grist*, *The Guardian*, *Mother Jones*, PBS's *Need to Know*, *Slate* and *Wired*.

Bloomberg News, <http://goo.gl/GVtQ7F>.

Discovery News' global warming video playlist (<http://goo.gl/wcf4W>).

background

Science is the human endeavor to explain the world around us. By nature, scientists are questioners. They question how things work, why something is happening and one another's work. When scientists study a problem, they develop a hypothesis, test it by running an experiment, and analyze the data produced from the experiments to decide whether it supports or undermines a hypothesis.

A scientific hypothesis that evolves into an accepted theory has been tested many times by many scientists whose results re-confirm the hypothesis. In other words, a scientific consensus is achieved, and accompanying it is a body of knowledge to explain the theory. Likewise, hypotheses are regularly rejected when scientists consistently produce research results that do not support their ideas. Scientists are bound by a professional code that requires "full disclosure" so they explain the uncertainty in their research results. One way to look at what scientists do is to compare their practice to lawyers. Lawyers have an argument they are trying to support and then look for all the evidence to support it and make the best case. Scientists look at and analyze the evidence and then develop scientific arguments based on the story found in the evidence. Moreover, scientists, unlike lawyers, reveal what is uncertain in their arguments.

Climate scientists have a big job to try to communicate their research in ways that help non-scientists understand our changing climate and be able to use the knowledge to inform decisions that affect us, and our planet. The complexity of the real world climate makes doing this difficult because there is an inevitable uncertainty in research results. A second challenge is science results are constantly being interpreted and re-communicated by others who have various interests - political, economic and ethical.

So, we - the public, media and policy-makers - have a big job too if we are going to use the best available information from science to make informed decisions about climate change. That is to try to appreciate how science knowledge develops and interpret it more with the objectivity of a scientist rather than the subjectivity of an advocate.

In this lesson students assume the roles of TV science journalists to report on the story of climate to the general public. By evaluating and piecing multiple streams of scientific evidence, students demonstrate what they are learning by interpreting climate change science while they develop a wide range of literacy skills. One of the big ideas we hope they leave Unit 1 appreciating is the real experiment that climate scientists are studying is not happening in a lab or in a computer simulation, it is happening all over the planet we live on. We humans started this experiment 150+ years when we began using fossil fuels to support most of our energy. Since Earth is the only planet we know about that supports life, unlike most science experiments, this experiment is not reproducible and we have only one chance to get it "right."

suggested procedure

assessing quality climate change reporting

1. Show the video *Climate Challenge* (<http://goo.gl/SsiAl>) and ask students to critique it. What did they think was effective or ineffective about this video? Ask students to brainstorm a list of characteristics that makes communication about scientific research effective. Share these traits on the board or digitally brainstorm as a class using an online app like www.mindmeister.com.
2. Have students individually select a print or video story about climate change by searching Climate Desk's* (www.climatedesk.org) headlines and archive, Bloomberg News, <http://goo.gl/GVtQ7F> or Discovery News' global warming video playlist (<http://goo.gl/wcf4WV>). **NOTE:** Teachers may also print out or copy 5-stories from Climate Desk and have students read different stories in groups of their choosing.

*Climate Desk collects climate news from print and video outlets including *The Atlantic*, The Center for Investigative Reporting, *Grist*, *The Guardian*, *Mother Jones*, PBS's *Need to Know*, *Slate* and *Wired*. Students can search the archive for topics or regions that are of special interest to them by scrolling to the bottom of the page.

3. After students read their articles, have them use the student page the TEXT REFLECTION GUIDE and critique how the climate change narrative was developed.

Pre-writing the climate change narrative

4. Divide students into teams of 4. Explain that they are going to be TV (or web) journalists who must create a compelling, evidence-based 2-minute news story about the climate change science explored in this and previous lessons. The story should inform a general audience of their peers using at least two graphs/images from Lesson 1.3.

Students should develop a script for the news report. They can videotape or present a “live news report” in front of the class. Stories should creatively use audio and visual elements. For live reports, students can create Power Point presentations to act as their “news screen” to the right of the anchor.

5. Teams can use the student page DEVELOPING THE SCIENCE NEWS STORY to organize thinking and prepare a story outline. **NOTE:** For tips on how to write effective TV news scripts see “News Writing Tips for TV News” (<http://goo.gl/QjegR>) and this BBC News lesson plan with writing templates, “Script-writing tips and real examples”(<http://bbc.in/16snBvP>)
6. Decide if you will be giving students in class or at-home time to complete their group news report.

presenting the story

7. Each team is provided with 2-minutes to present their climate change narrative in class.
8. Following each presentation, students are given a short period of time to ask questions. The teacher and/or class may use the attached CLIMATE CHANGE NARRATIVE RUBRIC to assess each presentation. Be sure to collect the rubrics following each presentation and share the student feedback appropriately.

wrap-up and discussion

9. Ask students to reflect generally on all the presentations with the student page PLUS / DELTA CHART. What were some of the more effective strategies students used? What techniques might have improved the climate change narratives?
10. Wrap up the discussion by asking students to reflect on the quote at the beginning of the lesson.

assessment

Students use the CLIMATE CHANGE NARRATIVE RUBRIC on the student pages for peer review of each team’s presentation. Copies of the rubric should be made for all students to review their peers’ presentations.

Teachers can also use student feedback to assess student’s ability to critically apply their knowledge of climate change science.

feedback

The authors of Hot value your thoughts and feedback on this curriculum. Please feel free to send us any suggestions or share anything your students found particularly interesting or engaging.

Comments can be sent to cah40@columbia.edu

Please use prompts below to respond to the text you just read/saw/heard/viewed. Use the back of this sheet if you need additional space.

STUDENT PAGE LESSON 1.5 CLIMATE CHANGE NARRATIVE

Exploring Quality Science News Stories

Name: _____

Date: _____

Thesis, purpose, theme, or main idea of the text:

List three relevant facts, ideas or events the author used to develop the main idea:

-
-
-

Vocabulary that needs defining:

Points of interest in the text:

Areas of improvement in the text:

Connections you made from reading/viewing the text (if you would like, you may draw a mind-map below):

Does the author offer a solution to his/her stated problem or do they leave you with a question they want you to think about? Explain your thoughts below.

STUDENT PAGE LESSON 1.5 CLIMATE CHANGE NARRATIVE**Developing your Science News Story**

Name: _____

Date: _____

DIRECTIONS

Use this graphic organizer to develop a 2-minute story on climate change for your peers. You may not use every prompt below, but you will likely use most of them. This sheet can also help your group assign roles. Possible roles include:

script writer: craft script from sample scripts found at BBC News @ <http://goo.gl/QjegR>.

fact checker: this person makes sure the claims made in the segment are supported by scientific evidence.

news anchor: narrates the story.

actor/s: someone might play a scientist that is being interviewed or people effected by climate change.

camera person / editor: if you're doing video someone will need to shoot and edit your segment.

Producer: if doing a live performance in class this person might prepare your Power Point™, video clips and audio.

Questions	Key Points for Narrative	Supporting Audio or Visual	Team Member & Role
What is the climate change research and/or challenge you want to share with your audience? <i>This is similar to your thesis statement.</i>			
What do you think are the most important lines of climate change evidence to support your story? <i>This is a series of claims supported by evidence.</i>	<ul style="list-style-type: none">•••		
Where is this climate change story happening? <i>This is the spatial scale or area for evidence.</i>			
How do we know the evidence being presented e.g. how was it obtained?			
How long have humans been the dominant driver of climate change? <i>This clarifies timescale or relevant time period.</i>			
Who and what is impacted by human-caused climate change and how ?			
Why does human-caused climate change matter?			
What fundamental actions do we need to take to address the problem and what might be the solutions?			

STUDENT PAGE LESSON 1.5 CLIMATE CHANGE NARRATIVE**Climate Narrative Rubric**

Name: _____

Date: _____

News segment producers: _____

Title of news segment: _____

DIRECTIONS:

This rubric can be used by the teacher or student peers to assess the quality of students' climate narratives. Be sure to write the names of the students on the team you are reviewing in the space provided above and your name (as the reviewer). Be sure the class / teacher determines the value of each dimension of the rubric before you assess.

Assessment Dimension	Point Value	Your Score
Script <i>Was the news segment built from a script?</i> <i>Did the script have a clear beginning, middle and end?</i> <i>Did the script make room for visuals, interviews and additional footage aka B-roll?</i>		
Titles <i>Was there a clear and concise headline?</i> <i>Was a main idea/thesis clearly articulated?</i> <i>Were events and speakers titled as they appeared in the story?</i>		
Claims and evidence <i>Were claims relevant to their main idea?</i> <i>Were claims clear understandable for peers?</i> <i>Were claims supported by diverse sources?</i> <i>Were lines of evidence coming from credible, properly cited sources?</i> <i>Were lines of evidence clearly sourced / credited?</i>		
Audio, Visual / Theatrical (for in class or video taped stories) <i>Did the team utilize visuals to enhance their story?</i> <i>Did the team use audio effectively (music, sound effects, and speaking)</i> <i>When possible, did the team utilize sets and costumes?</i>		
Mechanics <i>Did the team use a variety of sentences?</i> <i>Did the team avoid run-ons and present understandable thoughts?</i> Were <i>spelling, grammar and punctuation used appropriately?</i>		
Overall Creativity and Clarity <i>Did the team tell their narrative in a unique way?</i> <i>Did the team capture the audience's attention?</i> <i>Did the team present a science story that was clear and understandable?</i>		
TOTALS	100 points	

COMMENTS:

STUDENT PAGE LESSON 1.5 CLIMATE CHANGE NARRATIVE**+ / Δ Narrative Reflection**

Name: _____

Date: _____

DIRECTIONS:

This + / Δ graphic organizer can be used to reflect on the general quality of the presentations. Don't worry about a specific presentation. Instead focus on general trends. What did you think made a climate change narrative effective? What do you think was a stumbling block for teams trying to explain complicated science in two-minutes? Share your reflections in the space below.

**+ THINGS I LIKED ABOUT THE
PRESENTATIONS****Δ WHAT WOULD I CHANGE ABOUT THE
PRESENTATIONS?**